very many cases may arise in practice,—will also be of much service to architectural and mechanical draughtsmen, as it will tend very materially not only to abridge their time, but will save a vast deal of unnecessary trouble, and obviate the necessity of drawing the joints from the centre of the circle; or, by taking a_1 a_4 as centres, and with a radius greater than half a_1 a_4, describing arcs intersecting in g, and then drawing the joint from a_1 through g, and so on.

JOHN PHILLIPS.

INSTITUTION OF CIVIL ENGINEERS.

APRIL 22nd.—Sir John Rennie, President, in the chair.

The discussion upon the atmospheric railway system was renewed, and continued throughout the evening to the exclusion of every other subject.

The principle of the basis of Mr. Stephenson's calculations, that the maximum uniform or mean velocity was attained, appeared to be conceded; but a question had been raised upon what was termed an inconsistency in the experiments, which was the attainment of a steady height of barometer with an accelerating velocity. In order to substantiate the view, that a maximum velocity had never been attained, the steady height of the barometer, and the principle therein involved, was disputed, while no acceleration, made up by grouping a number of the velocities registered in the tables, was advanced as an inconsistency, amounting to a proof that the height of the barometer could not have been steady. The fallacy resulting from any arbitrary grouping of these registered velocities, in any of which no error of eight miles per hour might exist, was shewn by a comparative analysis of the grouping. If column No. 4, in the tabulated experiments, was grouped into divisions of five observations in each, an acceleration of 1-60 would be shewn; but if the division be made into groups of four observations in each, a *retardation* of 8 would result. This clearly shewed that either an acceleration or a retardation might be established from the same figures, depending upon the method of grouping them, which was entirely arbitrary. This test, therefore, of the amount of acceleration was considered nugatory. On the other hand, it was proved from the experiments of Mr. Stephenson and his assistants, corroborated by those of Mr. Bidder, that a perfectly steady height of barometer was maintained, and could be observed with the greatest accuracy, when there was nearly a balance between the power and the resistance, and therefore no forces were in operation to cause an undulation of the mercury.

As to the comparison between starting with a low amount of vacuum, and the getting up the steam under a locomotive, and then starting as soon as the steam would move the piston, it was contended that the raising the steam of the fixed engine ought equally to be taken as an element of the comparison if any deduction was drawn from it. In a similar comparison of the time required to attain a maximum speed by locomotives, on ordinary railways, it was shewn that it was rather a chemical than a mechanical question, depending upon the intensity of combustion in the fire-box, which would be at a minimum when the engine was stationary, and that it required a certain time to produce a sufficient amount of combustion to attain velocity; therefore the comparison was inadmissible. A balance, by figures, was established by Mr. Bidder, of the power given out and that observed by each of the resistances: from which balance that amount due to acceleration was ascertained, and it was shewn that this amount could only cause a certain amount of acceleration, which was all given out before the end of the experiments at Dalkey; and while the barometer was nearly uniform the acceleration was little more than was due to the progressive diminution of leakage.

NEW INVENTIONS.—A meeting will be held at the Islington Literary Institution on Thursday, the 8th of May, at 8 o'clock, for the exhibition and explanation of new inventions. The secretary will be happy to receive models &c. for that purpose if sent free of carriage prior to the 7th May.

THE DIFFICULTIES AND OBSCURITIES OF THE METROPOLITAN BUILDINGS ACT.

SIR,—Having by your courtesy been permitted recently to occupy so large a space in your columns, I had hoped that the remarks hazarded, principally upon points I conceived to be without the operation of the Act, would not have induced remark, nor comment on the future operation thereof. But feeling two points of difficulty to press very inconveniently as to the course to be adopted in practice, viz., the lack of declaration as to the reading put upon certain clauses by the official referees, and the obscurity of other clauses, where it would be unreasonable to expect either them or the district surveyor to give an intelligible reading thereof, I would suggest what appears a reasonable course to adopt in aid of the steps apparently intended to be taken by the note to your correspondent "Scrutator," in your journal of the 19th instant.

The Act is a public one, and I contend any party has perfect right to read for himself, and so read with a desire to conform to its enactments: I do not believe he would find let or hindrance from any constituted authority. That some men in new districts have offensively, in "litigious and unwise proceedings," exercised their "little brief authority" is quite true. Let them be met with firmness and fair argument; this evil will soon cure itself; and I quite believe that both referees and "the able and right-judging man," of whom you speak as district surveyors, will be very glad to come to a fair and intelligible understanding with their professional brethren, and those interested in the operation of the Act. The course I therefore would suggest is, at a timely moment, let a meeting be called, through the medium of an advertisement in your columns, perhaps aided by a leading article. At such meeting appoint a special committee to receive for a given period all communications: such committee, from the mass of evidence they will receive from parties who conceive themselves aggrieved, and taking up other points of apparent difficulty, viewing the whole with unbiassed minds, would be prepared to request a meeting with the official referees (which I feel satisfied would be accorded), and upon a fair and impartial statement, request them to issue a circular to the district surveyors as to their equitable decision or opinion upon the several points submitted to them *seriatim*. Having already assumed this authority in respect of matters in operation before the 1st of January, for all matters subsequently (being distinctly clothed with large equitable powers, and being the appellant court in case of difference), it would appear not to be probable that any district surveyor would venture to oppose his opinion to such a dictum, and the public would be too thankful to have such an authority as their sheet anchor.

In such a discussion I am fain to think, all parties would gladly avail themselves of the opportunity of drawing the attention of the legislature to the repeal or considerable alteration of many clauses. The referees and district surveyors can have no object in being at issue with their neighbours, and much good may be done by courteous communication. As a key to the kind of information that would be useful to such a proposed committee, I will give the evidence I have upon a few out of the number of difficulties that appear to present themselves.

From the part I have taken in the subject some professional men have asked my opinion upon the construction of schedule D. part 2, as to laying bond timber into walls, their doubt being strengthened by the district surveyor declining to give an opinion, which I think he was quite justified in doing. The paragraph alluded to states, "and every plate, lintel, bond, corbel, being of wood, and every wood-brick laid into any external wall, and all ends of joists, of girders, and of the heads and sills of partitions running into any external wall, must be fixed at a distance from the external face of the wall of four inches at the least." This would appear to be clear and intelligible: the point of difficulty is raised by the concluding paragraph: "But no timber must be laid into any external wall in such manner or of such length as to render the part of the wall above it wholly or in great part dependent upon the wood for support, or so that any such wood might not be withdrawn without endangering the safety of the superincumbent structure, except in the case of breastsummers." I am surprised that any doubt should have arisen on this point, but it is a matter better set at rest as proposed. My reading would be, the first enactment is clear and positive—adopt it. Will any district surveyor be bold enough to demur to it? the *onus probandi* of danger would be with him, as contemplating the very unusual course of withdrawing bond-plates or joists. The Act permits the erection of nine-inch walls, and has suggested no new mode of construction to render unnecessary the laying ends of joists into such walls: the exception in favour of breastsummers would appear singular, as they generally have a considerable superincumbent weight. Let a district surveyor object in any case to so laying timber in a nine-inch wall—*ex uno disce omnes*—no timber can be laid in such a wall, which would be an absurdity.

A difficulty has arisen in the minds of several professional men having works in operation under written contract, in consequence of section 9 declaring that, "the difference of the costs and expenses of the works when performed according to the provisions of this Act, and the works as stipulated for in such contract" are subject matter of reference. I consider this one of the most equitable clauses in the Act, viewing it as I do. It can have no relation to any written contract in respect of the completion of works commenced before the 1st January, and thus taken altogether out of the operation of the Act; but I can imagine not an extreme hypothetical case, where its operation would be essentially equitable. A party has entered into a written contract to build six houses of similar character and cost; three were so far progressed before the 1st of January as to be irrespective of the Act: the other three, not commenced, would come within its operation, and for want of conformity would be induced a larger outlay. The difference in such a case to be assessed by the district surveyor, or if disputed, by the referees. Here would appear a broad principle of justice: the contractor who probably had taken the contract with prospect of small gain, ought not to be the sufferer by a change in the law of the land he could not contemplate.

I regret not being able to accord the same merit to sec. 10, relating to the modification of building leases, which I fear will lead to serious mischief and litigation; but being a question rather for those learned in the law, I will not attempt to discuss it, nor at present refer to other similar points of difficulty, but urge each party to make out his own catalogue of complaints as the first step to inquiry.

I would close these remarks by drawing attention to what would appear a serious difficulty in carrying out the intended operations of the Act as to schedule H. relating to "drains into sewers." This section is very imperative, but owing to the reservation of powers by sec. 51 to commissioners of sewers, will, I fear, in large districts be found perfectly inoperative. The question of sewage in densely-populated districts is now a subject of public interest, hitherto not sufficiently understood; it appears to be a matter more peculiarly addressed to our attention as in connection with house drainage, and it is with deep regret I feel myself bound to declare, that enormous sums in large districts have been so unscientifically expended, as to prevent the possibility of the sewers being rendered available for house drainage; thus throwing an insurmountable difficulty in the way of carrying a portion of the Act into effect, which contemplated the health and comfort of a neighbourhood. It is a subject at a future period I propose to intrude on your columns.

GREENWAY ROBINS.

NASMYTH'S PILE-DRIVER.—The first experimental trial of this invention was made at Manchester on the 19th ultimo. From want of space a 14-inch pile of 16 feet in length was employed; this the machine drove 15 feet into hard ground with twenty blows, at the rate of 65 blows per minute. Two of these machines will very shortly be in full action at the great steam dock about to be constructed by the Admiralty at Devonport.

CHARITY IN MARYLEBONE.—No less a sum than 1,500*l.* has been distributed among the poor during the past twelvemonth by the district societies of this parish.